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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/832,978	04/12/2001	Hideo Kitagawa	35.C15293	9731

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EXAMINER

OLSEN, ALLAN W

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 08/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/832,978

Applicant(s)

KITAGAWA ET AL.

Examiner

Allan W. Olsen

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-4, 6-8, 10-15 and 17-19 rejected under 35 U.S.C. 102(a) as being anticipated by U. S. Patent 6,037,255 issued to Hussein et al. (hereinafter, Hussein).

Hussein teaches a method of patterning an organic dielectric layer (103). Hussein teaches applying a patterned photoresist to a hard mask layer (104) that overlies the organic dielectric. Hussein teaches patterning the hard mask layer in order to expose a portion of the underlying dielectric so that the exposed portion of the dielectric can be removed by plasma etching. Hussein teaches a plasma etching gas that contains N₂ and H₂. Hussein teaches the organic layer is a polymer. Hussein teaches the use of low k dielectric polymers such as FLARE™ and polyarylethers (column 2, line 57 - column 3, line 6). Hussein teaches using a hard mask material that that is the same as the barrier layer 102. Hussein teaches using titanium nitride as the barrier layer 102. Therefore, Hussein also teaches using titanium nitride as the hard mask material (column 3, lines 37-38 and column 2, lines 43-49). Hussein also discloses the utility of tantalum in the barrier/mask layers (column 3, line 63).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1763

Claims 9 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hussein.

As noted above, Hussein teaches the limitations of claims 1 and 11, upon which claims 9 and 20 respectively depend. Additionally it is noted that Hussein teaches that silicon nitride can be used as the hard masking layer.

Hussein does not teach an intermediate layer that is comprised of a metal or a metal compound and also an inorganic insulator in contact with the organic insulating film. Specifically, Hussein does not teach an intermediate TiN/SiN bi-layer layer overlying the organic insulating film.

It would have been obvious to one skilled in the art, at the time the invention was made, to use a TiN/SiN bi-layer layer overlying the organic insulating film because Hussein teaches that each of Si N and TiN can be independently used and "[i]t is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose."

In re Kerkhoven 205 USPQ 1069 (CCPA 1980). Cites *In re Susi* 169 USPQ 423, 426 (CCPA 1971); *In re Crockett* 126 USPQ 186, 188 (CCPA 1960). See also *Ex parte Quadranti* 25 USPQ 2d 1071 (BPAI 1992).

Claims 5 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hussein as applied to claims 1 and 11 above and further in view of Suzuki et al. in EP 0880164 (hereinafter, Suzuki).

Hussein does not teach using a surface-wave interfered plasma.

Suzuki teaches using a surface-wave interfered plasma.

It would have been obvious to one skilled in the art to use a surface-wave interfered plasma because Suzuki teaches that this provides a uniform high density plasma over a large area. Additionally a higher quality plasma processing can be accomplished at lower temperatures over a wider pressure range (column 4).

Art Unit: 1763


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 703-306-9075. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Greg Mills, can be reached on 703-308-1633.

The examiner's Right-Fax (direct to desktop) phone number is 703-872-9684. Alternatively, the general fax numbers for TC1700 are 703-872-9310 (non-after finals) and 703-872-9311(after-final).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Allan Olsen, Ph.D.
August 11, 2003

A handwritten signature in black ink, appearing to read "Allan Olsen". The signature is stylized, with the first name "Allan" written in a cursive-like script and the last name "Olsen" in a more formal, slightly cursive script.